

ABSTRACT

A marine seismic source method capable of retaining low frequencies is disclosed. One embodiment of the method comprises a seismic source that generates  
5 an up-going wave and first down-going wave with opposite polarity. The up-going wave reflects off the ocean surface as a second down-going wave having the same polarity as the first down-going wave and the first and second down-going waves combine substantially in-phase to form a third down-going wave. A source apparatus to accomplish the method is also disclosed. One source apparatus embodiment  
10 comprises a device wherein at least part of the device is below the surface of the water and the device is adapted to cause oscillations below the surface of the water, and means for oscillating the device in the water to create an up-going wave and a first down-going wave and the up-going wave has reverse polarity relative to the first down-going wave.

15